NRC JPM A

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Perform Reactor Startup

Job Performance Measure: NRC JPM A

K/A Reference: 201001 A2.04 (3.8, 3.9)

Examinee: _____

NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance:

Actual Performance: X

Classroom

Simulator X

Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 3% power and RPV pressure is 151 psig
- RPV level is 60 inches, being controlled by LIC-120 in automatic
- A plant startup is in progress per GP-2, Appendix 1, Reactor Startup and Heatup
- Control rods are being withdrawn per Control Rod Move Sheet Sequence 1D: LGS Sim U-1.0 on Step 17
- The next rod move step is to withdraw Control Rod 10-43

Initiating Cue:

You are the Reactor Operator. You have been directed to continue with the startup by withdrawing control rods in accordance with the control rod move sheet.

Required Materials:

None

General References:

ON-107, CRD Problems
ARC-MCR-108-F1, CRD Accumulator Trouble
ARC-MCR-108-G1, 1A / 1B CRD Water Pump Trip
ARC-MCR-108-G3, 1A / 1B CRD Pump Suction Lo Press
ARC-MCR-108-G4, CRD Drive Water Filter Hi Delta P
ARC-MCR-108-H3, CRD Pump Suction Filter Hi DP
ARC-MCR-108-H4, CRD Charging Water Low Pressure
TS 3.1.3.5, Control Rod Scram Accumulators
GP2 Appendix 1, Reactor Startup and Heatup, Revision 37
S46.6.A, Placing Alternate Control Rod Drive Pump In Service, Revision 22

JPM Origination: New

Task Standard:
Address the loss of CRD flow per ON-107 and respond to the subsequent resulting failure of two scram accumulators by tripping the reactor.

Alternate Path: Yes Time Critical: No Validation Time: 15 minutes

JPM Setup Instructions:

Summary Description of JPM:

The applicant will continue the startup by withdrawing control rods per the move sheets. The CRD suction water hi d/p annunciator will alarm 2 minutes after first rod notch out. Subsequently (2 min later), the CRD suction filter will fully clog resulting in a trip of the running 1A CRD pump. The applicant will respond per ARC, and then ON-107 to bypass the suction filter and restart the CRD pump. 30 seconds after restart, 1A CRD pump will trip from debris in the system. When CRD Pump 1B is started (per S46.6.A), debris will travel forward and clog the drive water filter. The applicant will direct placing the alternate drive water filter in service. However, the field equipment operator not be successful as local filter inlet valve is stuck. The applicant will receive alarms and reports of low nitrogen pressure in one CR accumulator followed thereafter by the same for a second accumulator. A manual reactor scram will be initiated per ON-107.

Simulator Setup:

1. Reset to a startup IC at RPV pressure of approximately 151 psig with 1A CRD Pump in operation.
2. Set up Trigger 1 to activate on depressing Control Rod Notch Out Pushbutton C11A-S46 on 10C603 Panel (WLCSWDR).
3. Set up Trigger 2 to activate on taking 1A CRD Pump Control Switch 1AP158 to START (ZLCS07AR).
4. Set up Trigger 3 to activate on taking 1B CRD Pump Control Switch 1BP158 to START (ZLCS07BR).
5. Set up to actuate CRD suction water hi d/p alarm (108 H-3) 2 minutes after Trigger 1 is activated.
6. Set up Malfunction MCR547 to clog the CRD suction filter 4 minutes after Trigger 1 is activated.
7. Set up Malfunction MCR412A to trip 1A CRD Pump 30 seconds after it is started.
8. Set up to actuate the drive water d/p alarm (108 G-4) 1 minute after Trigger 3 is activated.
9. Set up Malfunction MRC0016C for CR 22-35 Accumulator at 4 minutes after Trigger 3 is activated.
10. Set up Malfunction MRC0016C for CR 46-19 Accumulator at 5 minutes and 45 seconds after Trigger 3 is activated.

Simulator Tables:

Malfunction Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
MCR547		Running CRD Pump Trips on Clogged Suction Filter		True	00:00:00	00:04:00	00:00:00	1
MCR412A		Control Rod Drive Hydraulic Pump A Trips		True	00:00:00	00:00:30	00:00:00	2
MRD016C	22-35	Control Rod Failure, Accumulator Trouble		True	00:00:00	00:04:00	00:00:00	3
MRD016C	46-19	Control Rod Failure, Accumulator Trouble		True	00:00:00	00:05:45	00:00:00	3

Annunciator Summary

Window	Description	Tagname	Override Type	OVal	AVal	Actime	Dactime	Trig
G4	CRD Drive Water Filter Hi DP	108 REACTOR G4	ON			00:01:00	00:00:00	3
H3	CRD Pump Suction Filter Hi DP	108 REACTOR H3	ON			00:02:00	00:04:30	1

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	NOTCH withdraw control rods per CR Move Sheet Seq 1D: LGS Sim U-1.0.	Notch withdraws CRs 10-43, xx-xx and xx-xx from 04 to 06.	**Note:** Trigger 1 activates to start CRD trouble timing when notch withdraw pushbutton is depressed.
2	Respond to CRD alarm. **Cue**: If necessary, direct applicant to respond to alarms.	Announces alarms. Refers to ARC-MCR-108-H3 and ARC-MCR-108-G3.	**Note:** CRD suction filter hi d/p alarm will come in, followed 2 minutes later by trip of CRD pump.
3	Recognizes that ARC directs entry into ON-107, CRD System Problems.	Informs supervisor of direction to enter ON-107. **Cue:** When informed of ARC direction, hand copy of ON-107 to applicant and direct him/her to perform the actions of ON-107.	
4	IF operation of *A(B)P158, "CRD Pump," is threatened by low suction pressure, THEN OPEN 46-1F045, CRD Pumps Suction Filter Bypass.	Directs EO to open 46-1F045, CRD Pumps Suction Filter Bypass. **Cue:** EO acknowledges.	
5	IF 1A(B)P158, CRD Pump, has tripped, THEN PERFORM the following:	Not applicable.	
6*	IF 1A(B)P158, CRD Pump, tripped on low suction pressure, THEN OPEN 46-*F045 "Pump Suction Filter Bypass" ...	Directs EO to open 46-1F045, CRD Pumps Suction Filter Bypass. **Cue:** EO acknowledges	**Booth operator:** IF direction received to bypass suction filter, THEN remove Malfunction MCR547 one minute after the initial pump trip and report as EO, suction filter is bypassed.

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
7*	... AND START pump.	Restarts 1A CRD Pump.	**Note:** Trigger 2 activates on 1A CRD Pump handswitch to start, resulting in 1A CRD Pump trip on overload 30 seconds later.
8	IF *A(B)P158, "CRD Pump," can not be started, THEN PERFORM the following:	Not applicable.	
9	1. CLOSE 46-1F014A(B), Discharge Stop Check, for tripped pump. 2. PLACE alternate 1B(A)P158, CRD Pump, in service per S46.6.A.	Directs EO to close 46-1F014A. Refers to S46.6.A **Cue:** EO acknowledges	**Booth operator:** Report Valve 46-1F014A is closed.
10	ENSURE the following at 1B(A)P158, "Rod Drive Pump," to be started: • Proper oil levels in pump • 46-*F014B(A), CRD Pump Min-Flow Stop, full open • 46-1F015B(A), CRD Pump Min-Flow Stop Check, full closed • 46-1F014B(A), CRD Pump Discharge Stop Check, closed	Directs EO to perform pre-start checks and alignment on 1BP158 CRD Pump	**Booth operator:** Perform alignment actions and report actions completed.
11*	START *B(A)P158, "Rod Drive Pump" (PUMP) using HS-46-108B(A) at 1OC603.	Takes HS-46-108B to start and observes pump start.	**Note:** Trigger 3 will activate on 1B CRD Pump handswitch to start, resulting in drive water d/p alarm and subsequent accumulator trouble conditions.
12*	Slowly OPEN 46-1F014B(A), CRD Discharge Stop Check, at started Rod Drive Pump.	Directs EO to slowly open Discharge Stop Check 1F014B at CRD pump. **Cue:** EO acknowledges.	**Booth operator:** Report back that discharge stop check is being slowly opened **BUT <u>DO NOT</u>** open the valve. This simulates drive water filter completely clogged.

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
13	IF a second CRD pump was previously operating, THEN PERFORM the following: • CLOSE 46-1F014A(B), CRD Discharge Stop Check, of off-going Rod Drive Pump. • STOP HS-46-108A(B), Rod Drive Pump (PUMP), of off-going Rod Drive Pump at 1OC603. • ENSURE FULL OPEN 46-1F014A(B), CRD Pump Min-Flow Stop of off-going Rod Drive Pump.	Directs EO to close off-going pump disch stop and to ensure off-going min flow valve full open. **Cue:** EO acknowledges	
14	Observes indications of high d/p, clogged drive water filter.	Informs supervisor of high filter d/p and alarm. **Cue:** Report acknowledged. If necessary, direct applicant to respond to alarm.	
15	Refers to ARC-MCR-108-G4, CRD Drive Water Filter Hi Delta P	Refers to ARC. Refers back to ON-107 per ARC guidance.	
16*	IF 1A(B)P158, CRD Pump, is running but CRD drive flow is insufficient, THEN PERFORM one of the following as applicable: 1. PLACE alternate 1B(A)F204, CRD Drive Water Filter, in service per S46.6.C. 2. PLACE alternate FV-46-1F002B(A), CRD Flow Control Valve, in service per S46.6.B	Directs EO to place alternate drive water filter in service per S46.6.C	**Booth operator:** Respond as EO, obtain S46.6.C. After several minutes have elapsed, inform applicant having difficulty opening 46-1F020B, CRD Drive Water Filter Inlet. Mechanic is on scene, trying to determine if valve can be opened.
17	Responds to indications of 1st failed accumulator.	Informs supervisor. Refers to ARC-MCR-108-F1, CRD Accumulator Trouble.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
18	ARC Actions: 1. Follow Tech. Spec 3.1.3.5, pertaining to control rod scram accumulators. 2. Dispatch Operator to inspect HCU. 3. IF Nitrogen pressure low THEN adjust per S47.8.B AND investigate for leakage. 4. IF water is suspected THEN blowdown instrument block using S47.8.B accumulator pressure reduction section as guidance. 5. IF HCU indications are normal THEN instruct operator to check spade connectors for looseness in HCU transponder box using S47.8.C Attachment 2 as a guide.	Performs ARC actions: • Refers to TS • Dispatches EO to HCU • Investigates low N2 • Wtr not suspected • Chks spade connectors	**Booth operator:** If directed to investigate, report back as EO that cause of accumulator trouble is low nitrogen pressure.
19*	Responds to 2nd Acc Alarm per ON-107: IF more than one CRD scram accumulator is inoperable THEN: IF no CRD pump is operating AND reactor pressure is less than 900 psig, THEN: Manually SCRAM the reactor AND PLACE Reactor Mode Switch in "SHUTDOWN," AND ENTER T-100 OR T-101, as applicable.	Applicant manually scrams the reactor on 2 failed accumulators.	**Booth operator:** If directed to investigate, report back as EO that cause of accumulator trouble is low nitrogen pressure.
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM A

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is at 3% power and RPV pressure is 151 psig
- RPV level is 60 inches, being controlled by LIC-120 in automatic
- A plant startup is in progress per GP-2, Appendix 1, Reactor Startup and Heatup
- Control rods are being withdrawn per Control Rod Move Sheet Sequence 1D: LGS Sim U-1.0 on Step 17
- The next rod move step is to withdraw Control Rod 10-43

Initiating Cue:

You are the Reactor Operator. You have been directed to continue with the startup by withdrawing control rods in accordance with the control rod move sheet.

NRC JPM B

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Perform Reactor Heatup

Job Performance Measure: NRC JPM B

K/A Reference: 295031 EA1.03 (4.4, 4.4)

Examinee: _____

NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance:

Actual Performance: X

Classroom

Simulator X

Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- A seismic event has occurred, resulting in a LOCA with a loss of all offsite power.
- Reactor has scrammed, all rods inserted, all scram actions have been taken.
- Reactor vessel water level is minus (-)140" on Fuel Zone and lowering.
- Reactor pressure is 500 psig.
- Drywell pressure is 17 psig and rising.
- D11 and D13 Emergency Diesel Generators have tripped on ground fault.
- Suppression pool level is 21 feet and slowly lowering.
- Core spray has failed to automatically initiate.

Initiating Cue:

Shift Supervision directs you to manually initiate Core Spray System per S52.7.A. An additional RO is available to acknowledge alarms. Another RO has been briefed to perform SE-10 LOCA actions when the LOCA signal has been initiated.

Required Materials:

S52.7.A, Manual Initiation After Failure Of Automatic Injection During A LOCA
S52.7.B, Core Spray Injection with a Single Operable Pump

General References:

S52.7.A, Manual Initiation After Failure Of Automatic Injection During A LOCA, Rev. 009
S52.7.B, Core Spray Injection with a Single Operable Pump, Rev. 9

JPM Origination: Modified Limerick Bank JPM 128, Rev. 000

Task Standard:

Core spray manually initiated and throttled per S52.7.A.

Alternate Path: Yes Time Critical: No Validation Time: 8 minutes

JPM Setup Instructions:

Summary Description of JPM:

A major seismic event has occurred, where Loop B Core Spray is the only available injection source during a small LOCA. Loop A LPCI and CS are unavailable due to loss of power to Buses D11 and D13. RHR is unavailable because Loop B RHR Injection Isolation Valves F017B and F017D are jammed closed. A slow suppression pool leak has lowered pool level to less than 22 feet. A large LOCA occurs at the moment the applicant initiates a manual CS initiation signal. Core Spray Pump 1D fails to auto start and trips shortly after it is manually started. RPV pressure is low enough (~200 psig) that Core Spray Pump B will be near runout conditions. Per S52.7.B, the applicant must throttle Loop B Core Spray Inboard Valve F037 to maintain core spray flow as close as possible to the maximum of 3175 gpm while not exceeding the 3175 gpm limit in order to ensure pump runout (which could lead to pump damage) does not occur.

Simulator Setup:

1. Reset to normal at-power IC.
2. Insert the following malfunctions:
   a. MHP447B HPCI Aux Oil Pump Trips
   b. MRC466 Inadvertent Trip of RCIC Overspeed Mechanism
   c. MSL559 SLC Injection Line Rupture Inside the Drywell
   d. MFW244A Reactor Feed Pump A Trip
   e. MFW245A Reactor Feed Pump B Trip
   f. MFW246A Reactor Feed Pump C Trip
   g. MVI237A Reference Leg 1D004A Level Defect at 60 severity
   h. MVI237B Reference Leg 1D004B Level Defect at 60 severity
   i. MVI237C Reference Leg 1D004C Level Defect at 60 severity
   j. MVI237D Reference Leg 1D004D Level Defect at 60 severity
   k. MCS183D Core Spray Pump 1D Fails to Auto Start
   l. MCS182D Core Spray Pump 1D Trips
   m. MCS184A Core Spray Inboard Valve 1F005 Fails As Is
   n. MRH174B RHR Injection Valve (F017B) Fails As Is
   o. MRH174D RHR Injection Valve (F017D) Fails As Is
   p. MDG418A Diesel Generator D11 Trips
   q. MDG418C Diesel Generator D13 Trips
   r. MED261 Loss of Offsite Power
   s. MPC257 Supp Pool Leak to Reactor Enclosure at 20,000 gpm severity
   t. MRR440A Recirc Loop A Rupture at 2% severity
3. Override annunciators as needed to provide seismic event alarms.
4. Operate SRVs as needed to reduce and control pressure at approximately 500 psig.
5. When indicated RPV level is approximately minus (-)140, remove Malfunction MRR440A, Recirc Loop A Rupture.

6. Reduce Malfunction MPC257 severity to 2,000 gpm when indicated suppression pool level is approx equal to 21 feet.
7. Set up Trigger 1 to activate on illumination of Core Spray Loop D LOCA Initiation Indicating Lamp E21A-S17D on 10C601 Panel (ZLOB1(7540)).
8. Set up Malfunction MRR440A, Recirc Loop A Rupture at 50% severity on Trigger 1.
9. Set up Override on D124-G-D Supply Breaker Control Switch in CLOSE on Trigger 1 with 5 second delay to simulate operator performing SE-10 actions on LOCA initiation.
10. Set up Override on 10Y202 Reset on Trigger 1 with 7 second delay to simulate operator performing SE-10 actions on LOCA initiation.
11. Acknowledge alarms and freeze simulator.

Simulator Tables:

Malfunction Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
MHP447B		HPCI Aux Oil Pump Trips		True	00:00:00	00:00:00	00:00:00	0
MRC466		Inadvertent Trip of RCIC Overspeed Mechanism		True	00:00:00	00:00:00	00:00:00	0
MSL559		SLC Injection Line Rupture Inside the Drywell		True	00:00:00	00:00:00	00:00:00	0
MFW244A		Reactor Feedpump A Trip		True	00:00:00	00:00:00	00:00:00	0
MFW245A		Reactor Feedpump B Trip		True	00:00:00	00:00:00	00:00:00	0
MFW246A		Reactor Feedpump C Trip		True	00:00:00	00:00:00	00:00:00	0
MVI237A		Reference Leg 1D004A Level Defect		60	00:00:00	00:00:00	00:00:00	0
MVI237B		Reference Leg 1D004B Level Defect		60	00:00:00	00:00:00	00:00:00	0
MVI237C		Reference Leg 1D004C Level Defect		60	00:00:00	00:00:00	00:00:00	0
MVI237D		Reference Leg 1D004D Level Defect		60	00:00:00	00:00:00	00:00:00	0
MCS183D		Core Spray Pump 1D Fails to Auto Start		True	00:00:00	00:00:00	00:00:00	0
MCS184A		Core Spray Injection Valve HV52-1F005 Fails As-Is		True	00:00:00	00:00:00	00:00:00	0
MRH174B		RHR Valve HV51-1F017B Fails As-is		True	00:00:00	00:00:00	00:00:00	0
MRH174D		RHR Valve HV51-1F017D Fails As-is		True	00:00:00	00:00:00	00:00:00	0
MDG418A		Diesel Generator D11 Trips		True	00:00:00	00:00:00	00:00:00	0
MDG418C		Diesel Generator D13 Trips		True	00:00:00	00:00:00	00:00:00	0
MED261		Loss of Offsite Power		True	00:00:00	00:00:00	00:00:00	0
MPC257		Leak From Suppression Pool (1-100,000 gpm)		2000	00:00:00	00:00:00	00:00:00	0
MRR440A		Recirculation Loop A Rupture		50	00:00:00	00:00:00	00:00:00	1
MCS182D		Core Spray Pump 1D Trips		True	00:00:00	00:00:00	00:00:00	0

Override Summary

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
52-20224/CS	Safeguard Bus D124-G-D Supply Breaker Control Switch	CLOSE		ON		00:00:05	00:00:00	1
52-20224/CS	Safeguard Bus D124-G-D Supply Breaker Control Switch	NACLOSE		OFF		00:00:05	00:00:00	1
52-20224/CS	Safeguard Bus D124-G-D Supply Breaker Control Switch	NATRIP		OFF		00:00:05	00:00:00	1
52-20224/CS	Safeguard Bus D124-G-D Supply Breaker Control Switch	TRIP		OFF		00:00:05	00:00:00	1
43-22422/CS	Breaker Trip RESET for 120 VAC Panel 10Y202	RESET		ON		00:00:07	00:00:00	1

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	TURN collar of the following MANUAL INITIATION pushbuttons to "ARMED":	Not applicable	
2	a. (INITIATION 1) E21-S22A	Rotates core spray manual initiation pushbutton collar S22A clockwise to the ARMED position.	Not critical since D11 de-energized.
3*	b. (INITIATION 2) E21-S22B	Rotates core spray manual initiation pushbutton collar S22B clockwise to the ARMED position.	
4	c. (INITIATION 3) E21-S22C	Rotates core spray manual initiation pushbutton collar S22C clockwise to the ARMED position.	Not critical since D13 de-energized.
5	d. (INITIATION 4) E21-S22D	Rotates core spray manual initiation pushbutton collar S22D clockwise to the ARMED position.	Not critical since CS Pump D will not auto start on init signal. Must be manually started.
6	VERIFY the following annunciator alarms:	Not applicable	
7	DIV 1 CORE SPRAY MANUAL INITIATION SWITCH ARMED AND DIV 3 CORE SPRAY MANUAL INITIATION SWITCH ARMED, annunciator alarms on *13 COOL A	DIV 1 and DIV 3 Core Spray manual initiation switch armed annunciators are verified lit on 113 COOL A.	
8	DIV 2 CORE SPRAY MANUAL INITIATION SWITCH ARMED AND DIV 4 CORE SPRAY MANUAL INITIATION SWITCH ARMED, annunciator alarms on *15 COOL A	DIV 2 and DIV 4 Core Spray manual initiation switch armed annunciators are verified lit on 115 COOL B.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
9	DEPRESS AND RELEASE all four of the following MANUAL INITIATION pushbuttons to initiate Core Spray System:	N/A	
10	a. (INITIATION 1) E21-S22A	Momentarilly depresses and then releases MANUAL INITIATION pushbutton S22A.	Not critical since D11 de-energized.
11*	b. (INITIATION 1) E21-S22B	Momentarilly depresses and then releases MANUAL INITIATION pushbutton S22B.	
12	c. (INITIATION 1) E21-S22C	Momentarilly depresses and then releases MANUAL INITIATION pushbutton S22C.	Not critical since D13 de-energized.
13	d. (INITIATION 1) E21-S22D	Momentarilly depresses and then releases MANUAL INITIATION pushbutton S22D. **Cue:** If necessary, inform applicant that another RO has been directed to perform SE-10 actions upon LOCA signal initiation.	Not critical since CS Pump D will not auto start on init signal. Must be manually started.
14*	Start the "1D" Core Spray Pump.	Recognizes only 1B Core Spray started. Informs supervisor and manually starts 1D Core Spray Pump.	Pump trips on start. However, step is critical since required two-pump operation could not be established without attempting a start.
15	ENSURE the following Core Spray Pump minimum flow bypass valves are open: • -HV-52-*F031A, MIN FLOW • -HV-52-*F031B, MIN FLOW	Determines F031A has no power. Verifies minimum flow valve HV-52-1F031B is closed as expected with flow greater than 775 gpm after 3 second delay.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
16	WHEN Reactor Pressure is between 435 to 475 psig, THEN VERIFY the following:	Determines following actions are required because pressure is already less than 435 psig.	
17	HV 52 *F005, OUTBOARD, open.	Verifies HV-52-1F005 is open **Note:** Loop A pumps are not running so F005 position verification not important.	
18	HV 52 *F037, INBOARD DISCHARGE, open.	Verifies HV-52-1F037 is open.	
19	NOTE: Two pump operation is required to prevent pump damage due to run out. IF only one Core Spray Pump in a loop is running, THEN GO TO S52.7.B, Core Spray Injection with a Single Operable Pump.	Recognizes only 1B CS Pump running. Refers to S52.7.B.	
20	IF single operable Core Spray Pump in loop is not essential to maintain reactor level, THEN PERFORM the following: 1. TRIP pump 2. EXIT procedure	Not applicable. CS Pump operation is essential.	
21	IF single operable Core Spray Pump in loop is essential to maintain reactor level, THEN VERIFY all three of the following conditions for operation are satisfied: 1. Pump is run no longer than one hour. 2. Suppression pool temperature less than 198°F. 3. Suppression pool level greater than 22 feet.	Verifies pump has not run >1 hr. Verifies SP temp <198°F. Determines SP level is NOT > 22 feet. Informs supervisor that all three conditions are NOT met. Pool level is <22 feet.	**Note:** SP level indicated on L152-140A at 10C626 will continue to indicate 23.6' due to the power failures. Applicant will need to realize this is not a valid indication based on LR55-115 at 10C648 (20.8') and also plant computer (21')

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
22*	IF all three conditions are not met, THEN OBTAIN SSV approval AND THROTTLE HV 52 *F005(A Loop)/HV-52-*F037(B Loop), DISCHARGE to less than 3,175 gpm on FI 52 *R601A(B), FL, at panel *0C601.	Requests approval to throttle HV-52-1F037 to < 3175 gpm on FI-52-1R601B, FL, at panel 10C601. AND Throttles flow to <3175 gpm. [Acceptable range is 2900 gpm to 3175 gpm]	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM B

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- A seismic event has occurred, resulting in a LOCA with a loss of all offsite power
- Reactor has scrammed, all rods inserted, all scram actions have been taken.
- Reactor vessel water level is minus (-)140" on Fuel Zone and lowering.
- Reactor pressure is 500 psig.
- Drywell pressure is 17 psig and rising.
- D11 and D13 Emergency Diesel Generators have tripped on ground fault.
- Suppression pool level is 21 feet and slowly lowering.
- Core spray has failed to automatically initiate.

Initiating Cue:

Shift Supervision directs you to manually initiate Core Spray System per S52.7.A. An additional RO is available to acknowledge alarms. Another RO has been briefed to perform SE-10 LOCA actions when the LOCA signal has been initiated.

NRC JPM C

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Open An MSIV

Job Performance Measure: NRC JPM C

K/A Reference: 239001 A2.03 (4.0, 4.2)

Examinee: _____

NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 35% power.
- Outboard MSIV HV-41-1F028B closed due to a rupture of the air exhaust line from the MSIV.
- The MSIV air exhaust line has been repaired.

Initiating Cue:

You have been directed to open the MSIV per S41.3.B.

Required Materials:

None

General References:

S41.3.B, Reopening A Single Isolated MSIV, Revision 11

JPM Origination: New

Task Standard:

Reopen a spuriously closed MSIV at power.

Alternate Path: No Time Critical: No Validation Time: 8 minutes

JPM Setup Instructions:

Summary Description of JPM:

The applicant will open the MSIV in accordance with S41.3.B.

Simulator Setup:

1. Reset to approximately 35% power.
2. Insert Malfunction MMS064B to fail closed Inboard MSIV HV-41-1F022B.
3. Place HV-41-1F028B in TEST on 10C601.
4. Remove Malfunction MMS064B.
5. Allow plant to stabilize.
6. Place simulator in Freeze.

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	**CAUTION** Steps 4.3.2 through 4.3.9 removes condensate from Main Steam lines prior to opening MSIV **AND** placing Main Steam line inservice, **AND** may change dose rates in the vicinity. (Step 4.3.1) INFORM HP that the valves listed in step 4.3.2 will be operated AND another steam flow path is being established.	Informs HP.	
2	(Step 4.3.2) ENSURE alignment of the following Main Steam System valves at panel *0C601:		
3*	• HV-C-41-*F020, Main Steam Line Pressure Equalizing Valve - OPEN	Ensures HV-C-41-1F020 is open.	
4*	• HV-41-*42 Bypass Leakage Barrier Block OPEN	Ensures HV- 41-142 is open.	
5*	• HV-41-*43 Bypass Leakage Barrier Block OPEN	Ensures HV- 41-143 is open.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
	CAUTION Reactor power must be closely monitored while performing steps 4.3.3 through 4.3.12.		
6	(Step 4.3.3) ALIGN the following Main Steam System valves to drain condensate from upstream **AND** downstream piping around outboard MSIV at panel *0C601:		
7*	• HV-41-*F016, Main Steam Drain -OPEN	Opens HV-41-1F016.	
8*	• HV-41-*F019, Main Steam Drain - OPEN	Opens HV-41-1F019.	
9*	• HV-41-*F021, Main Steam Drain To Cond - OPEN	Opens HV-41.1F021.	
10*	(Step 4.3.4) OPEN HV-01-*04, Main Steam Line Startup Drain (STARTUP DRAIN), at panel *0C653.	Opens HV-01-104 at Panel 10C653.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
11	**NOTE** S06.1.I U/*, Accessing Information At The Feedwater Level Control System Operator Station, provides directions on how to access screens at FWLCS Operator Station. **CAUTION** 1. Only equipment associated with the main steam line with the MSIV being reopened is to be operated. 2. MSIV's are designed to open with no more than 200 psid. (Step 4.3.5) IF MSIV was not isolated in accordance with S41.3.C, Isolation of One Main Steam Line at Power (i.e. unplanned MSIV closure), THEN PERFORM the following:		
12*	1. DEPRESS white SINGLE pushbutton on LIC-M1-*R600, Reactor Level Controller (MASTER, LV), at panel *0C603.	Depresses SINGLE pushbutton on LIC-M1-1R600 on 10C603.	
13	2. VERIFY white SINGLE pushbutton is lit on LIC-M1-*R600, Reactor Level Controller (MASTER, LV), at panel *0C603.	Verifies SINGLE pushbutton is lit.	
14	3. MARK steps 4.3.6.1, 4.3.6.2 and 4.3.6.3 as N/A AND CONTINUE.	Marks steps as N/A.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
15	(Step 4.3.6) VERIFY MSIV Test Mode is activated at FWLCS Operator Station as follows…	Not applicable.	
16*	**NOTE** The outboard MSIV should be opened soon after inboard MSIV is fully closed. (Step 4.3.7) CLOSE HV-41-*F022A(B, C, D), Inboard MSIV, at panel *0C601.	Closes HV-41-1F022B (INBOARD) at Panel 10C601.	
17*	(Step 4.3.8) OPEN HV-41-*F028A(B, C, D), Outboard MSIV, at panel *0C601.	Opens HV-41-1F028B (OUTBOARD) at Panel 10C601.	
18	(Step 4.3.9) WAIT 5 to 10 minutes before proceeding to the next step to allow condensate to drain.	**Cue:** 10 minutes have elapsed.	
19*	(Step 4.3.10) OPEN HV-41-*F022A(B, C, D), Inboard MSIV, at panel *0C601.	Opens HV-41-1F022B (INBOARD) at Panel 10C601.	
20	(Step 4.3.11) ALIGN the following Main Steam System drain valves, unless otherwise directed by GP-2, Normal Plant Startup, at panel *0C601:		
21*	• HV-41-*F016, Main Steam Drain- CLOSED	Closes HV-41-1F016.	
22*	• HV-41-*F019, Main Steam Drain - CLOSED	Closes HV-41-1F019.	
23*	• HV-41-*F021, Main Steam Drain To Cond - CLOSED	Closes HV-41.1F021.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
24*	(Step 4.3.12) CLOSE HV-01-*04, Main Steam Line Startup Drain (STARTUP DRAIN), at panel *0C653.	Closes HV-01-104 at Panel 10C653.	
25	**NOTE** S06.1.I U/*, Accessing Information At The Feedwater Level Control System Operator Station, provides directions on how to access screens at FWLCS Operator Station. **CAUTION** IF MSIV Test Mode is deactivated with an inboard MSIVOR outboard MSIV closed, THEN an RPV level transient will occur. (Step 4.3.13) IF MSIV was not isolated in accordance with S41.3.C, Isolation of One Main Steam Line at Power (i.e. unplanned MSIV closure), THEN PERFORM the following:		
26*	1. DEPRESS white THREE pushbutton on LIC-M1-*R600, Reactor Level Controller (MASTER, LV), at panel *0C603.	Depresses THREE pushbutton on LIC-M1-1R600 on Panel 10C603.	
27	2. VERIFY white THREE pushbutton is lit on LIC-M1-*R600, Reactor Level Controller (MASTER, LV), at panel *0C603.	Verifies THREE pushbutton is lit.	
28	3. MARK step 4.3.14 as N/A AND CONTINUE	Marks the step N/A.	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM C

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is at 35% power.
- Outboard MSIV HV-41-1F028B closed due to a rupture of the air exhaust line from the MSIV.
- The MSIV air exhaust line has been repaired.

Initiating Cue:

You have been directed to open the MSIV per S41.3.B.

NRC JPM D

2008 Limerick Operating Exam

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: Limerick

Task Title: Manually Start HPCI

Job Performance Measure: NRC JPM D

K/A Reference: 206000 A4.01 (3.8, 3.7)

Examinee: _____

NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 100% power
- No equipment is out of service
- Steam Leak Detection System is available
- Suppression Pool Cooling is in service
- HPCI Oil Reservoir is filled to high in the normal operating range on sightglass
- HPCI is lined-up for automatic operation per S55.1.A
- Reactor Enclosure Equipment Compartment Exhaust is in service
- ST-6-060-390-1 is currently being performed by the Reactor Operator
- No maintenance has been performed on the Turbine oil system or governor control system
- No water was drained from any part of the system
- The Vibration Monitoring System is in service

Initiating Cue:

You are directed by Shift Supervision to place Unit 1 HPCI in full flow test, CST to CST, with pump discharge pressure at least 120 psig greater than reactor pressure, using the manual quick start method for a 1 hour PMT per S55.1.D section 4.1.

Required Materials:

S55.1.D, HPCI System Full Flow Functional Test, Rev. 34

General References:

JPM Origination: Modified Limerick Bank JPM 19 Revision 008

Task Standard:

Starts HPCI in full flow test (CST to CST) lineup, with pump discharge pressure at least 120 psig greater than reactor pressure, using manual quick start method. Trips turbine within 60 seconds after start due to lack of min flow protection.

Alternate Path: Yes Time Critical: No Validation Time: 15 minutes

JPM Setup Instructions:

Summary Description of JPM:

The applicant is directed to perform full flow HPCI test from CST back to CST. He/she will partially align HPCI full flow path back to CST by opening Condensate Return Valve HV-55-1F011. When the motor operator engages, the valve stem separates from the valve disk. The valve remains closed but the valve stem travels. All indications are that the valve strokes open normally. Min Flow Valve HV-55-1F012 is in normal pre-start closed position, but is failed as-is, such that it will not open when demanded by pump discharge pressure >125 psig and pump flow <550 gpm. The applicant will start the HPCI turbine and, per procedure, will open HPCI Test Loop Shutoff HV-55-1F008 to establish full flow conditions. However, flow will not increase because 1F011 is closed in series with the 1F008 valve. The applicant will announce unexpected indications and should attempt to open Min Flow Valve HV-55-1F012. Per precautions, HPCI is not allowed to run without min flow protection for greater than 60 seconds. The applicant will recognize the challenge to this limitation and trip the HPCI turbine within 60 seconds of the turbine start.

Simulator Setup:

1. Reset to a full power IC
2. Place Suppression Pool Cooling in service
3. Place B Loop ESW in service
4. Override HPCI Min Flow Valve HV55-1F012 indicating lights (green-ON, red-OFF) to indicate valve closed.
5. Set up Trigger 1 to activate when HV-55-1F011 handswitch taken to OPEN on 10C647 (ZHPS111C).
6. Set up Malfunction MHP578C to fail HV55-1F011 in position at 1 second after Trigger 1 is activated, with de-activation time of 27 seconds.
7. Set up override of 1F011 indicating lights to indicate valve full open (green-OFF, red-ON) at 26 seconds after Trigger 1 is activated.
8. Set up override of 1F011 switch to the CLOSE position at 25 seconds after Trigger 1 is activated.
9. Acknowledge alarms and freeze simulator.

Simulator Tables:

Malfunction Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
MHP578C	C	HV55-1F011 Fails: As-Is		True	00:00:00	00:00:01	00:00:27	1

Override Summary

Tag ID	Description	Position / Target	Actual Value	Override Value	Rmptime	Actime	Dactime	Trig
HS55-1F012	HV55-1F012, HPCI Pump Min Flow Valve Ind Lamps	GREEN		ON		00:00:00	00:00:00	0
HS55-1F012	HV55-1F012, HPCI Pump Min Flow Valve Ind Lamps	RED		OFF		00:00:00	00:00:00	0
HS55-1F011	HV55-1F011, HPCI Test Return Valve Ind Lamps	GREEN		OFF		00:00:26	00:00:00	1
HS55-1F011	HV55-1F011, HPCI Test Return Valve Ind Lamps	RED		ON		00:00:26	00:00:00	1
HS55-1F011	HV55-1F011, HPCI Test Return to CST	CLOSE		ON		00:00:25	00:00:00	1
HS55-1F011	HV55-1F011, HPCI Test Return to CST	OPEN		OFF		00:00:25	00:00:00	1
HS55-1F011	HV55-1F011, HPCI Test Return to CST	PTS		OFF		00:00:25	00:00:00	1

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	IF required to limit Suppression Pool temperature anytime during this procedure, then refer to S51.8.A Suppression Pool Cooling Operation (Startup and Shutdown) and Level Control, and PLACE Suppression Pool Cooling Mode of RHR System in Service	Not applicable	
2	If Vibration Monitoring System is available, then verify in service **Cue**: Vibration Monitoring system is in service.	Not applicable	
3	Ensure the following valves are CLOSED: • HV-55-1F071, "HPCI/RCIC Flush Line to Suppression Pool" (TEST OUTBOARD) • HV-55-1F008, "Test Loop Shutoff" (TEST ISOL) • HV-55-1F011, "HPCI/RCIC Test Return to CST" (CONDENSATE RETURN) • HV-49-1F022, "RCIC Test Loop Isolation"(TEST ISOL)	Verifies valves closed by position indication: Green lights ON Red lights OFF	
4*	Open HV-55-*F011, Condensate Return.	Places handswitch in OPEN. Valve indicates full open.	**Note:** Valve and stem will separate. Valve will remain closed but indication will show valve strokes open normally.
5	START 10P0216, "Barometric Condenser Vacuum Pump" (VACUUM PUMP).	Takes handswitch to start. 10P216 indicates running.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
6	Monitor Suppression Pool temperature per ST-6-060-390-1, Suppression Pool Temperature Check. **Cue**: ST-6-060-390-1 is being performed by an additional operator.	Not applicable.	
7	INFORM HP of changing radiological conditions due to HPCI System start.	HP notified HPCI start is imminent.	
8	ENSURE FIC-55-*R600, "HPCI Pump Discharge Flow Controller" (FL), set to 5600 gpm in "AUTO"	FIC-55-1R600 M/A selector switch in the "A" position. Flow controller FIC-55-1R600 set between 5,500 and 5,700 GPM.	
9	Make Plant Announcement for HPCI startup.	Plant Announcement for HPCI startup performed.	
10*	Simultaneously open HV-55-1F001, "HPCI Steam Supply" (INLET) AND Start 10P213, "Auxiliary Oil Pump" (AUX OIL PUMP).	Simultaneously positions handswitches. HV-55-1F001 is open and 10P213 is running.	
11*	When SI-56-161, "Turbine Speed" (S), starts to go up, then immediately throttle open HV-55-1F008, "HPCI Test Loop Shutoff" (TEST ISOL), until desired flow is obtained, while maintaining turbine speed greater than 2,200 rpm.	Observes speed increase. Immediately opens F008 Valve. Maintains speed > 2200 rpm.	
12	Recognizes pump flow is not increasing.	Observes pump flow is not increasing. Informs supervisor. **Cue:** Acknowledge report.	**Note:** No flow due to 1F011 stem/disk separation.

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
13*	Recognizes that pump min flow valve (F012) is not open.	Observes min flow valve F012 is not open. Informs supervisor. Attempts to open HV-55-1F012. **Cue:** Acknowledge report.	Note to examiner: F012 is failed closed, however by design it should automatically open at <550 gpm with disch pressure > 125 psig. S55.1.D, Precaution 3.7 states operator action may be required to open HV-55-1F012, MIN FLOW valve.
14*	Trips the HPCI turbine.	Trips the HPCI turbine **within 60 seconds** after opening 1F001 Steam Supply Valve. **Cue:** **IF** applicant recommends tripping HPCI turbine, then acknowledge report and direct the applicant to trip the HPCI turbine.	Note to examiner: Procedure precaution: "Do **not** allow HPCI to operate without min flow protection for greater than 60 seconds. (S55.1.D, Step 3.7)
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM D

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is at 100% power
- No equipment is out of service
- Steam Leak Detection System is available
- Suppression Pool Cooling is in service
- HPCI Oil Reservoir is filled to high in the normal operating range on sightglass
- HPCI is lined-up for automatic operation per S55.1.A
- Reactor Enclosure Equipment Compartment Exhaust is in service
- ST-6-060-390-1 is currently being performed by the Reactor Operator
- No maintenance has been performed on the Turbine oil system or governor control system
- No water was drained from any part of the system
- The Vibration Monitoring System is in service

Initiating Cue:

You are directed by Shift Supervision to place Unit 1 HPCI in full flow test, CST to CST, with pump discharge pressure at least 120 psig greater than reactor pressure, using the manual quick start method for a 1 hour PMT per S55.1.D section 4.1.

NRC JPM E

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Initiate Containment Spray Job Performance Measure: NRC JPM E

K/A Reference: 226001 A4.03 (3.5, 3.4)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- The reactor is shutdown due to a large steam leak inside primary containment.
- Reactor water level is being maintained by the RO using S/U level control.
- Cooling water is not required to the Post LOCA Recombiners and the HV57-168A valve has been verified closed.
- 1A RHR Pump has tripped.
- No other testing or plant condition that could interfere with this procedure is being performed.

Initiating Cue:

You are directed by Shift Supervision to establish one loop of Drywell Spray using the 1B Loop of RHR per T-225.

Required Materials:

Copy of T-225, Startup And Shutdown Of Suppression Pool And Drywell Spray Operation

General References:

T-225, Startup And Shutdown Of Suppression Pool And Drywell Spray Operation, Rev. 20

JPM Origination: Modified Limerick Bank JPM 32, Rev. 005

Task Standard:

Establish one loop of Drywell Spray with 1B RHR pump

Alternate Path: Yes Time Critical: No Validation Time: 10 min

JPM Setup Instructions:

Summary Description of JPM:

The applicant is directed to spray the drywell with 1B RHR pump. After pump is started and flow adjusted, the pump will trip. The applicant will have to identify available alternate paths for drywell spray and will then be directed to spray the drywell using fire water. The applicant will perform Section 4.7 to align fire water for drywell spray.

Simulator Setup:

1. Reset the simulator to IC 17.
2. Insert Steam Leak in Drywell - Malfunction MMS067 at 2000 gpm.
3. The following actions should be taken:
   a. Mode switch to SHUTDOWN
   b. Insert SRM's & IRM's
   c. Line up Condensate System to STARTUP level control with 138A in AUTO
   d. Bypass and restore D/W Cooling
4. Reduce the steam leak to 300 gpm when drywell pressure reaches 25 psig.

   NOTE: This will keep reactor pressure high enough to prevent the LOCA signal from coming in while the JPM is being performed.

5. Set up Malfunction MRH171B to trip 1B RHR Pump on Manual Trigger 1.
6. Set up Remote RTR267 for YES to open FW cross-tie on Manual Trigger 2.
7. Acknowledge and reset Alarms and FREEZE the simulator.

Simulator Tables:

Malfunction Summary

Malf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Dactime	Trig
MMS067		Steam Leak in Drywell (0-5000 gpm)		300	00:00:00	00:00:00	00:00:00	0
MRH171B		RHR Pump 1B Trips		True	00:00:00	00:00:00	00:00:00	1

Remotes Summary

Remf ID	Mult ID	Description	Current Value	Target Value	Rmptime	Actime	Trig
RTR267		T-225 Fire Water Crosstie to RHR		YES	00:00:00	00:00:00	2

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	Obtain current revision of T-225. **Cue:** Provide copy of T-225 after applicant demonstrates the ability to locate the current revision of the procedure.	Obtains current revision of T-225. Refers to Section 4.5, Initiating Drywell Spray Using RHR	
2	System aligned per S51.1.A Set up of RHR System for Auto Operation in LPCI Mode.	Verifies 1B RHR is in the LPCI Standby Mode.	
3	ENSURE HV51-1F004A (B), Suppression Pool Suction (SUCTION), open.	Verifies HV51-1F004B is open.	
4	ENSURE the following valves closed:	Not applicable	
5	HV51-1F006A (B), SUCTION.	Verifies HV-51-1F006B is closed.	
6	HV51-1F015A (B), OUTBOARD.	Verifies HV-51-1F015B is closed.	
7	HV51-1F016A (B), OUTBOARD.	Verifies HV-51-1F016B is closed	
8	HV51-1F017A (B), RHR LPCI Injection (OUTBOARD)	Verifies HV-51-1F017B is closed	
9	Announce start of 1B RHR pump on Plant P.A. system.	Makes P.A. announcement that 1B RHR pump will be started	
10*	IF RHR pump not running, THEN START 1A(B)P202 RHR pump.	Starts 1B RHR pump by positioning handswitch to START.	
11	Acknowledge alarm B/D RHR or Core Spray pump running.	Acknowledges Alarm 110 D5, 1B/1D Core Spray/RHR Pump Running.	
12	ENSURE the following valves open:	Not applicable	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
13	HV51-1F047A(B) RHR Heat Exchanger Shell Side Inlet (INLET)	Verifies HV51-1F047B is OPEN.	
14	HV51-1F003A(B) RHR Heat Exchanger Shell Side Outlet (OUTLET)	Verifies HV51-1F003B is open.	
15	HV51-1F048A(B) RHR Heat Exchanger Shell Side Bypass (HEAT EXCH BYPASS)	Verifies HV51-1F048B is open. Red light ON, green OFF.	
16	TRIP Reactor Recirc Pumps.	Verifies the Reactor Recirc pumps are already OFF.	
17	REMOVE D/W Cooling Fans from service by placing all 16 switches to OFF.	Verifies D/W Cooler handswitches are all in OFF.	
18	IF Drywell High Pressure AND LOCA signals are present, THEN GO TO step 4.5.11.	Not applicable	
19*	PLACE E11A-S61B, INITIATION, switch for B Loop operation at panel 10C601 (Main Control Room) to ARM.	Per Step 4.5.10, Places E11A-S61B collar to ARM.	
20	Acknowledge annunciator DIV 2 RHR Manual Initiation Switch Armed.	Alarm Acknowledged	
21*	DEPRESS AND RELEASE E11A-S61B	Depress and release E11A-S61B.	
22	VERIFY LOOP B INJECTION white indicating light lit.	White indicating light (Loop B injection) associated with E11A-S61B is verified LIT.	
23	OPEN HV51-1F024A(B), Full Flow Test Return (SUPP POOL CLG.)...	Throttles open HV51-1F024B.	
24	...AND OBTAIN flow of 9,250 to 10,500 gpm as indicated on FI-51-1R603A(B)	Flow indicates 9250 to 10,500 GPM on FI-51-1R603B.	**Booth operator:** After flow is adjusted, activate Manual Trigger #1 to trip 1B RHR Pump

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
25*	Applicant notes trip of B RHR pump	Applicant reports trip of B RHR pump. **Cue:** Ask applicant, "what alternate paths are available for spraying the drywell." Applicant should respond that drywell can be sprayed with RHRSW or Fire Water. **Cue:** After answer is provided, direct use of fire water.	
26	ENSURE the following valves closed:	Refers to Section 4.7 of T-225, Fire Water Crosstie.	
27*	HV-51-1F004B, 1B RHR Pump Suction PCIV (SUCTION B)	Closes valve.	
28	• HV-51-1F006B, 1B RHR Pp S/D Clg Suct Intertie Vlv (SUCTION B) • HV-51-1F015B, 1B Shutdown Clg Injection PCIV (OUTBOARD) • HV-51-1F016B, 1B RHR Cntmt Spray Line Outboard PCIV (OUTBOARD) • HV-51-1F017B, 1B RHR LPCI Inj PCIV (OUTBOARD)	Verifies valves closed.	
29*	HV-51-1F024B, 1B RHR Pp Full Flow Test Return Vlv (SUPP POOL CLG B)	Closes valve.	
30	HV-51-1F027B, 1B RHR Supp Pool Spray Line PCIV (SUPP POOL SPRAY)	Verifies valve is closed	
31*	HV-51-1F047B, 1B RHR Htx Shell Side Inlet Vlv (INLET)	Closes valve.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
32*	HV-51-1F048B, 1B RHR Htx Shell Side Bypass Vlv (HEAT EXCH BYPASS)	Closes valve.	Note: Type in procedure. Says HV-**C**-51-1F048B.
33	051-1F098, Cond Trans Fill Isol Vlv to 1A & 1B RHR Loops (402-R11-253) (ATTACHMENT 6)	Directs EO to verify valve closed.	
34	PERFORM the following in 402-R16-253 (ATTACHMENT 5): 1. CONNECT hose at 51-1179, 1B RHR Fire Protection Crosstie Connection Drain Valve AND Route to drain THEN CYCLE 51-1179 open AND closed to ensure piping vented. 2. CONNECT hose at 22-1430, Fire Protection/RHR Interconnection Drain Valve AND Route to drain THEN CYCLE 22-1430 open AND closed to ensure piping vented. 3. CONNECT hose to fitting downstream of 22-1429, Fire Protection/RHR Interconnection Isolation Valve. 4. CONNECT other end of hose to 51-1178, 1B RHR Fire Protection Crosstie Connection Isolation Valve. 5. OPEN 22-1429. 6. OPEN 51-1178.	Directs EO to perform local fire water alignment.	**Booth operator:** Activate Manual Trigger #2 to locally align fire water. Report back as EO that fire water aligned as directed.

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
35	REQUEST SSV verify drywell temperature AND drywell pressure are on SAFE side of Drywell Spray Initiation Limit curve per T-102, Primary Containment Control OR SAMP-1, RPV and Primary Containment Flooding Control.	D/W pressure and temperature readings are given to the CRS prior to Spraying and confirmation is received from the CRS that it is Safe to spray the drywell. **Cue:** Request drywell temperature and pressure. After being given D/W temperature and pressure readings, state that it is safe to spray the drywell.	
36	Trip Reactor Recirc Pumps.	Verifies pumps tripped.	
37	REMOVE Drywell Cooling Fans from service by placing all 16 Drywell Cooler Fan switches to OFF.	Verifies fans in OFF.	
38	MONITOR Drywell pressure.	Drywell pressure is observed.	
39*	OPEN HV-51-1F021B, 1B RHR Cntmt Spray Line Inboard PCIV, (INBOARD) AND HV-51-1F016B, 1B RHR Cntmt Spray Line Outboard PCIV, (OUTBOARD), at 10C601.	Per Step 4.7.10, opens valves.	
40*	ENSURE 00P512, Motor Driven Fire Pump, OR 00P511, Diesel Driven Fire Pump, running.	Starts Motor OR Diesel Driven Fire Pump.	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM E

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- The reactor is shutdown due to a large steam leak inside primary containment.
- Reactor water level is being maintained by the RO using S/U level control.
- Cooling water is not required to the Post LOCA Recombiners and the HV57-168A valve has been verified closed.
- 1A RHR Pump has tripped.
- No other testing or plant condition that could interfere with this procedure is being performed.

Initiating Cue:

You are directed by Shift Supervision to establish one loop of Drywell Spray using the 1B Loop of RHR per T-225.

NRC JPM F

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Transfer Loads to Unit Aux Trans Job Performance Measure: NRC JPM F

K/A Reference: 262001 A4.04 (3.6, 3.7)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- GP-2 is being performed on Unit 1.
- 11 and 12 Unit Auxiliary Busses are being powered from offsite sources.

Initiating Cue:

You are directed by Shift Supervision to transfer house loads for Unit 1 to the Unit Aux. Transformer per S91.6.A.

Required Materials:

None

General References:

S91.6.A, Transferring House Loads To Unit Auxiliary Transformer, Rev. 15

JPM Origination: Limerick Bank JPM 25, Rev. 004

Task Standard:

11 and 12 Unit Auxiliary Busses being supplied by the Main Generator.

Alternate Path: No Time Critical: No Validation Time: 10 minutes

JPM Setup Instructions:

Simulator Setup:

1. Reset simulator to any power IC.
2. Transfer 11 and 12 busses to offsite.

3. Ensure that only one 13.2 kV aux bus is selected for fast transfer to a given offsite source.

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	Obtain current revision of S91.6.A. **Cue:** Provide copy of S91.6.A to applicant after applicant demonstrates the ability to locate the current revision of the procedure.	Current revision of S91.6.A obtained.	
2	Determining section to perform. Perform the appropriate section as follows: 1. Perform Section 4.2 to transfer 11 Aux Bus 2. Perform Section 4.3 to transfer 12 Aux Bus. 3. Perform Section 4.4 to transfer 21 Aux. Bus. 4. Perform Section 4.5 to transfer 22 Aux Bus.	Refers to Section 4.2.	
3*	Place 225-10113/SS synchronization switch to ON.	Places Sync Switch to ON.	
4	Verify incoming voltmeter AND running voltmeter read approximately 110V.	Observes that V/I-UAS and V/R-UAS are both approximately 110V.	
5	IF incoming / running voltages differ by greater than 8 volts, THEN adjust startup bus voltage to obtain less than 8 volts difference.	Observes that V/I-UAS and V/R-UAS voltages are within 8 volts of each other.	
6*	CLOSE and HOLD 252-10113/CS, Aux Feed.	Holds 252-10113/CS in CLOSE when incoming and running voltages are both approximately 110 and within 8 volts of each other.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
7*	When 252-10113/CS, Aux Feed indicates closed, then release 252-10113C/CS.	Releases 252-10113C when Aux. Feed indicates closed. Red light lit, green light out.	
8	Verify 252-10102/CS, 10/11 Feed AND 252-10106/CS, 20/11 Feed OPEN	Verifies 10/11 and 20/11 feeds OPEN.	
9	Acknowledge Alarm 175 GEN 1 F1	Depresses alarm acknowledge pushbutton.	
10*	Place 225-10113/SS synchronization switch to OFF.	Sync Switch 225-10113/SS handle OFF	
11	Ensure 252-10102/CS, 10/11 Feed AND 252-10106/CS, 20/11 Feed in NORMAL AFTER TRIP	Verifies 252-10102/CS and AND 252-10106/CS in NORMAL AFTER TRIP.	
12	Reset Alarm 125 GEN 1 F1	Depresses Reset Pushbutton.	
13	Place 243-101/CS, Fast Transfer Select to 10-11	Places 243-101/CS in 10-11 position.	
14*	Place 225-10213/SS synchronization switch to ON.	Refers to Section 4.4. Inserts synch switch handle and turns clockwise to ON position then releases.	
15	Verify incoming voltmeter and running voltmeter read approximately 110V.	Observes that V/I-UAS and V/R-UAS voltages are both approximately 110V.	
16*	Close and hold 252-10213/CS, Aux Feed.	Holds 252-10213/Cs in CLOSE when incoming and running voltages are both approximately 110 and within 8 volts of each other .	
17*	WHEN 252-10213/CS, Aux Feed indicates closed, then release 252-10213/CS.	Releases 252-10213/CS when AUX. FEED indicates closed.	
18	Acknowledge alarm 125 GEN 1 F-24.	Depress alarm acknowledge pushbutton.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
19	Verify 252-10202/CS, 10/12 Feed and 252-10206/CS, 20/12 Feed open.	Verifies 10/12 and 20/12 feeds open.	
20	Place 225-10213/SS Synchronization Switch to OFF.	Places 225-10213/SS handle in OFF.	
21	Ensure 252-10202/CS, 10/12 Feed and 252-10206/CS, 20/12 Feed in NORMAL AFTER TRIP.	Verifies 252-10202/CS AND 252-10206/CS in NORMAL AFTER TRIP.	
22*	Place 243-102/CS, Fast Transfer Select to 20-12	Places 242-102/CS in 20-12 position.	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM F

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- GP-2 is being performed on Unit 1
- 11 and 12 Unit Auxiliary Busses are being powered from offsite sources

Initiating Cue:

You are directed by Shift Supervision to transfer house loads for Unit 1 to the Unit Aux. Transformer per S91.6.A.

NRC JPM G

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Align RECW For Drywell Cooling Job Performance Measure: NRC JPM G

K/A Reference: 400000 K1.02 (3.2, 3.4)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- DW Chilled Water has been lost due to trips on both Drywell Chiller Units.
- The reactor was manually scrammed.
- DW temperature is 146°F and rising.
- DW pressure is 1.2 psig and rising.
- The CRS has entered T-102, Primary Containment Control.
- RWCU has been shutdown per S44.2.A, Reactor Water Cleanup Shutdown.
- Equipment operators are stationed in the field to support this activity.

Initiating Cue:

You are directed by Shift Supervision to align RECW operation to cool the drywell, using A Loop first per S13.6.D.

Required Materials:
None

General References:
T-102, Primary Containment Control Bases, Rev. 22
S13.6.D, RECW Operation with Loss of Drywell Chilled Water, Rev. 14
S44.2.A, Reactor Water Cleanup Shutdown, Rev. 23
ARC-MCR-118-H5, REAC ENCL COOLING WATER HEAD TANK HI/LO LEVEL

JPM Origination: New

Task Standard:

Leaking DW Loop A is isolated from both RECW and DWCW. RECW is aligned to cool the drywell using DW Loop B.

Alternate Path: Yes Time Critical: No Validation Time: 10 minutes

JPM Setup Instructions:

Summary Description of JPM:

Both drywell chiller units have tripped and efforts to restore have been unsuccessful. The reactor has been manually scrammed. Drywell temperature is 148°F and rising. The applicant is directed to align RECW to the A Loop of the drywell chill water system. When aligned, the Loop will begin leaking inside primary containment. The applicant will recognize multiple indications of RECW leakage and recognize the challenge to the RECW system. The applicant will isolate Loop A Drywell Cooling from both RECW and DWCW and then align RECW to Loop B Drywell Chill Water. JPM is complete when the leak is isolated and the drywell is being cooled by RECW via the B Loop.

Simulator Setup:

1. Reset the simulator to any at-power IC.
2. Insert Malfunction MPC482A(B) to trip the running DW Chiller.
3. Manually start the standby DW chiller.
4. Insert Malfunction MPC482B(A) to trip the DW chiller that was just manually started.
5. Perform GP-4 shutdown, scram reactor, secure recirc pumps.
6. Allow DW temperature to rise to 146°F.
7. Shutdown RWCU per S44.2.A.
8. Set up indications of a RECW leak through the drywell cooling line, automatically triggered off of switch actions described in S13.6.D Step 4.2.8 "PLACE HSS-87-121A, Loop Drywell Water Source Mode Switch (LOOP), in RE CLG WTR"
    a. Use alarm overrides to simulate the leak in drywell and the effects on RECW head tank. Override RECW system pressure indicator (begin at 1:35 to allow model to drive PI for the realignment to RECW DW clg) ramped to indicate gradual loss of suction head. Alarms expected for RECW leak in DW coolers 111 A5, 112 A5 (1:40), RECW Hd Tk (118 H5 2:10), Leak rate increase (112 C5 and light on back panel HS61-145-1 at t=4:40), alarms expected for degraded RECW system 118 H3, 111 A3, 112 A3 and RECW pump vibration.
9. Freeze simulator

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	Obtain a current revision of S13.6.D, RECW Operation With Loss of Drywell Chilled Water	Obtains a current revision of S13.6.D.	
2	Reviews precautions.	Reviews precautions. **Cue:** If necessary, inform applicant that Precaution 3.1 does not apply to the current plant condition. Shift manager has confirmed that alignment of RECW cooling to the drywell is required by T-102.	
3	(Step 4.2.1) SHUTDOWN RWCU system per S44.2.A, Reactor Water Cleanup Shutdown.	Not applicable. RWCU system already shutdown. **Cue:** If necessary, inform applicant that RWCU has already been shutdown IAW S44.2.A.	
4*	(Step 4.2.2) CLOSE HV-13-*02, Cooling Water to Reactor Building Isolation (SUPPLY ISOL).	Closes HV-13-102.	
5	(Step 4.2.3) IF loss of instrument air prohibits closure of HV-13-*02, SUPPLY ISOL, THEN CLOSE 13-*039, RECW Header Valve to RWCU Non-Regen Heat Exchanger.	Not applicable	
6	(Step 4.2.4) Block CLOSE the following sample point isolation valves:	Not applicable.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
7	HV-51-*F080A, RHR Sample Line Downstream Isolation (SAMPLE OUTBOARD)	Verifies HV-51-1F080A closed.	
8	HV-51-*F080B, Main Steam Line Outboard Sample (SAMPLE OUTBOARD)	Verifies HV-51-1F080B closed.	
9	HV-41-*F085, RHR Sample Line Downstream Isolation (DRAIN SAMPLE OUTBOARD)	Verifies HV-41-1F085 closed.	
10	HV-43-*F020, Recirc Sample Line Outboard Isolation (SAMPLE)	Verifies HV-43-1F020 closed.	
11	023-1246, FW to Rx Sump Isol Vlv	Blocks 023-1246 closed. **Cue:** EO reports valve is closed.	
12*	(Step 4.2.5) CLOSE the following breakers: • D*14-R-C-15 (124A) • D*14-R-C-19 (124B) • D*14-R-C-16 (125A) • D*14-R-C-20 (125B)	Directs EO to close following breakers: D114-R-C-15 D114-R-C-19 D114-R-C-16 D114-R-C-20	**Booth operator:** Close breakers locally using Remote Function RPC306 on Manual Trigger 1. Report breakers are closed.
13	(Step 4.2.7) IF required THEN BYPASS isolations per GP-8.5.	Not applicable.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
14*	(Step 4.2.8) PLACE HSS-87-*21A(B), Loop Drywell Water Source Mode Switch (LOOP), in "RE CLG WTR" for loop to be supplied by RECW AND VERIFY the following: • Red indicating lights RECW IN AND RECW OUT Lit • Green indicating lights CHLD WTR IN AND CHLD WTR OUT Lit	Places HSS-87-121A in RE CLG WTR position for LOOP A. Verifies valves indicate flow path open from RECW and closed from Chill Water.	**Note:** The RECW leak into the drywell through the Loop A Drywell Cooling line will be simulated by initiating a Loop B (not Loop A) leak triggered shortly after HSS-87-121A is placed in RE CLG WTR position. DWCW valves fully close before RECW valves begin to open. Complete swapover take 72 seconds. **Note:** If applicant erroneously aligns cooling to Loop B (initiating cue says Loop A), allow him to continue, then after completed, cue to continue with procedure. Other DW cooling loop is needed.
15	(Step 4.2.9) VERIFY Drywell Isolation Loop A(B) (LOOP) red indicating lights DRYWELL INLET AND DRYWELL OUTLET Lit for loop to be supplied by RECW. • LOOP A HS-87-*28 • LOOP B HS-87-*22	Verifies valves open: • LOOP A HS-87-128 • LOOP B HS-87-122	
16	(Step 4.2.10) IF RECW flow is insufficient for adequate cooling, THEN PLACE standby RECW Heat Exchanger in service AND ...	**Cue:** CRS has directed Equipment Operators to perform Step 4.2.10 to place standby RECW HX in service.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
17	Responds to RECW Head Tank level alarm.	Refers to ARC for Alarm Panel 118 Window H-5, REAC ENCL COOLING WATER HEAD TANK HI/LO LEVEL. **Cue:** If necessary, direct applicant to respond to alarms.	
18	Verify RECW Head Tank 10T201 level locally using LG-13-101.	Directs EO to check level locally.	**Booth operator:** Report back as EO that either level is 11 inches and lowering approximately 10 inches every 30 seconds - OR - if head tank is empty, that head tank level is off scale low (based on system pressure <140 psig on overriden instrument)If asked, report that demin water supply valve LV-13-101 is fully open.
19	IF losing excessive water inventory, THEN have Operator walkdown system to check for leaks.	Directs EO to walkdown system looking for leaks.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
20*	Recognizes likely leak location is on Loop A of Drywell Cooling and isolates Loop A Drywell Cooling Loop from RECW.	Isolates the leak from RECW by placing HSS-87-121A in the DWCW position. **Cue:** If necessary, CRS should ask applicant to identify the location of the leak and take necessary actions to isolate and to maintain the RECW system.	**Booth operator:** Manually trigger Loop A leak (MPC500A = 30%) when handswitch returned to DWCW position. Remove Malfunction for Loop B leak (MPC500B) after the Loop A Leak Malfunction is active. Restore normal RECW indications (Head Tank Level Alarm, system pressure). **Booth operator:** Report as EO, RECW Head Tank level is rising.
21*	Recognizes leak is not isolated from Chill Water system and isolates Loop A DW cooling loop.	Isolates the leak from the Chill Water system by placing HSS-87-128 in the CLOSE position.	
22*	(Step 4.2.11) IF other Drywell Chilled Water loop is needed, THEN PLACE HSS-87-*21B(A), Loop Drywell Water Source Mode Switch (LOOP), in RE CLG WTR AND VERIFY the following: • Red indicating lights RECW IN **AND** RECW OUT Lit. • Green indicating lights CHLD WTR IN **AND** CHLD WTR OUT Lit. • Drywell Isolation Loop B(A) (LOOP) red indicating lights DRYWELL INLET **AND** DRYWELL OUTLET Lit. - LOOP A HS-87-*28 - LOOP B HS-87-*22	Places HSS-87-121B, Loop Drywell Water Source Mode Switch (LOOP) in RE CLG WTR position and verifies proper indicating lights. **Cue:** If necessary, cue the applicant to proceed with establishing drywell cooling by having the CRS ask applicant to report the status of establishing drywell cooling with RECW. If necessary, direct applicant to continue with the procedure to establish drywell cooling.	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM G

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- DW Chilled Water has been lost due to trips on both Drywell Chiller Units.
- The reactor was manually scrammed.
- DW temperature is 146°F and rising.
- DW pressure is 1.2 psig and rising.
- The CRS has entered T-102, Primary Containment Control.
- RWCU has been shutdown per S44.2.A, Reactor Water Cleanup Shutdown.
- Equipment operators are stationed in the field to support this activity.

Initiating Cue:

You are directed by Shift Supervision to align RECW operation to cool the drywell, using A Loop first per S13.6.D.

NRC JPM H

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Man Initiate CR Toxic Chem Isolation Job Performance Measure: NRC JPM H

K/A Reference: 290003 A4.01 (3.2, 3.2)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: Actual Performance: X

Classroom Simulator X Plant

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Control Room HVAC is in the normal operating mode.
- The Control Room Emergency Fresh Air Supply system is lined up for automatic operation.

Initiating Cue:

You are directed by Shift Supervision to manually initiate a Control Room HVAC Chlorine/Toxic Chemical Isolation for maintenance using the 'B' subsystem only per S78.8.A Section 4.5. All prerequisites are met

Required Materials:

None

General References:

S78.8.A, Manual Initiation Of Control Room Radiation Or Chlorine/Toxic Chemical Isolation, Revision 15

JPM Origination: Limerick Bank JPM 23, Rev. 006

Task Standard:

The Control Room HVAC system is operating in the Chlorine/Toxic Chemical Isolation mode with a chlorine/toxic chemical isolation signal present on B and D isolation channels and no radiation isolation signals present.

Alternate Path: No Time Critical: No Validation Time: 15 minutes

JPM Setup Instructions:

Simulator Setup:

1. Reset the Simulator to IC-17.
2. Ensure the B CREFAS Fan switch is in AUTO and the A CREFAS Fan switch is in STBY.
3. Ensure the A Control Room Supply and Return fans are in RUN, and the B Control Room Supply and Return fans are in AUTO.

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1*	VERIFY Control Room HVAC in normal operating mode per S78.1.A, Placing the Control Room HVAC System into Normal Operation. **Cue:** If asked, inform applicant that Control Room HVAC is in the normal operating mode per S78.1.A.	Recognizes from task conditions that Control Room HVAC is in normal operating mode per S78.1.A. OR consulted supervisor to obtain this information.	
2	VERIFY Control Room Emergency Fresh Air System lined up for automatic operation per S78.1.B, Aligning the Control Room HVAC Isolation and Emergency Fresh Air Supply System for Automatic Operation. **Cue:** If asked, inform applicant that Control Room Emergency Fresh Air System is lined up for automatic operation per S78.1.B.	Recognizes from task conditions that Control Room Emergency Fresh Air System is lined up for automatic operation, OR consulted supervisor to obtain this information.	
3	ENSURE keys for keylock handswitches HS-78-017B,D (RESET), are available.	Obtains two keys for keylock handswitches HS-78-017B,D (RESET).	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
4	IF no chemical isolation has been initiated, THEN ENSURE alignment as follows: • HS-78-010B, 'B' CONT RM EMERG FRESH AIR FAN CONT 0BV127, in AUTO • HS-78-010A, 'A' CONT RM EMERG FRESH AIR FAN 0AV127, in STANDBY	Verifies handswitches properly aligned.	
5*	Step 4.5.2.1 PLACE Control Room Isolation Valve Reset Keylock Switch HS-78-017B (RESET B) to RESET.	Reset Keylock switch HS-78-017B (RESET B) is placed in RESET at 00C681.	
6*	Step 4.5.2.2 PLACE Control Room Isolation Valve Reset Keylock switch HS-78-017D (RESET D) to RESET.	Reset Keylock switch HS-78-017D (RESET D) is placed in RESET at 00C681.	
7*	Step 4.5.3.1 PLACE Control Room Isolation Valve Trip Switch HSS-78-017B (TRIP B) to CI2.	Switch HSS-78-017B (TRIP B) arming collar is rotated to CI2 at 00C681.	
8*	Step 4.5.3.2 PLACE Control Room Isolation Valve Trip Switch HSS-78-017D (TRIP D) to CI2.	Switch HSS-78-017D (TRIP D) arming collar is rotated to CI2 at 00C681.	
9*	Step 4.5.4.1 PLACE Control Room Isolation Valve Reset Keylock switch HS-78-017B (RESET B) to "AUTO".	Reset Keylock switch HS-78-017B (RESET B) is placed in "AUTO" at 00C681.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
10*	Step 4.5.4.2 PLACE Control Room Isolation Valve Reset Keylock switch HS-78-017D (RESET D) to "AUTO".	Reset Keylock switch HS-78-017D (RESET D) is placed in "AUTO" at 00C681.	
11*	Step 4.5.5.1 DEPRESS AND RELEASE pushbutton portion of Trip Switch HSS-78-017B (TRIP B).	Switch HSS-78-017B (TRIP B) pushbutton is depressed and released at 00C681.	
12*	Step 4.5.5.2 DEPRESS AND RELEASE pushbutton portion of Trip Switch HSS-78-017D (TRIP D).	Switch HSS-78-017D (TRIP D) pushbutton is depressed and released at 00C681.	
13	Step 4.5.6 RECORD CREFAS run time in appropriate log.	CREFAS start data is recorded in CREFAS run time log.	
14	Step 4.5.7 ENSURE CHLOR ISLN Channel B,D amber lights are lit.	Observes CHLOR ISLN Channel B,D amber lights are lit on 00C681.	
15	Step 4.5.8 VERIFY CONTROL ROOM CHLORINE ISOLATION INITIATED annunciator alarmed at 002 VENT A-2.	Verifies CONTROL ROOM CHLORINE ISOLATION INITIATED Annunciator (002 A-2) is in.	
16	Step 4.5.9 VERIFY CONTROL ROOM ISOLATION NOT COMPLETE annunciator is not alarmed at 002 VENT A-3, after 25 seconds.	Verifies CONTROL ROOM ISOLATION NOT COMPLETE Annunciator (002 A-3) is not alarmed 25 seconds after the isolation is initiated.	
17	Step 4.5.10 ENSURE 0B(A)V127, EMERGENCY AIR FAN B(A), is running.	Verifies 0BV127, EMERGENCY AIR FAN B, is running.	
18	Step 4.5.11 ENSURE 0A(B)V116, CONTROL ROOM AIR SUPPLY FAN A(B) running.	Verifies 0AV116, SUPPLY FAN A, is running.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
19	Step 4.5.12 ENSURE 0A(B)V121, CONTROL ROOM AIR RETURN FAN A(B) running.	Verifies 0AV121, RETURN FAN A, is running.	
20	Step 4.5.13 VERIFY PDI-78-054, CONTROL ROOM AIR INSIDE/OUTSIDE ΔPX,is 0 inches of water after a time delay **Cue:** The JPM is complete.	Verifies PDI-78-054, CONTROL ROOM AIR INSIDE/OUTSIDE ΔPX indicates 0 inches of water after a time delay.	

Verification of Completion

Job Performance Measure: NRC JPM H

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

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_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit Control Room HVAC is in the normal operating mode.
- The Control Room Emergency Fresh Air Supply system is lined up for automatic operation.

Initiating Cue:

You are directed by Shift Supervision to manually initiate a Control Room HVAC Chlorine/Toxic Chemical Isolation for maintenance using the 'B' subsystem only per S78.8.A Section 4.5. All prerequisites are met.

NRC JPM I

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Alt Injection From The Fire System Job Performance Measure: NRC JPM I

K/A Reference: 295031 EA1.08 (3.8, 3.9)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 2 reactor level is low and injection is being established
- Reactor pressure is 50 psig
- The Motor Driven Fire Pump is out of service and unavailable

Initiating Cue:

Shift Supervision directs you to perform T-244 to supply Fire Water to increase Unit 2 reactor level.

Required Materials:

BL-840 Key for T-225 Hose Storage Cabinet (475-R17-253)

General References:

T-244, Alternate Injection from the Fire System, Rev. 14

JPM Origination: Limerick Bank JPM 260, Rev. 006

Task Standard:

Backup Diesel Driven Fire Pump started locally.

Alternate Path: No Time Critical: No Validation Time: 25 min

JPM Setup Instructions:

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	Obtain current revision of Unit 2 T-244.	Current revision of Unit 2 T-244 obtained.	
2	Obtain necessary Tools/Equipment from Unit 2 T-225 Hose Storage Cabinet(475-R17-253), BL-840 key required. **Cue:** You have the necessary tools/equipment in your possession.	Necessary tools/equipment obtained.	
3*	CONNECT hose at 51-2179 2A RHR/Fire Protection Interconnection Drain Vlv. AND ROUTE to drain THEN CYCLE 51-2179 open AND closed to ensure pipe vented. **Cue:** Connected as described.	Connects hose at 51-2179 AND routes to drain. 51-2179 cycled to vent pipe.	
4*	CONNECT hose at 22-2430 Fire Protection/RHR Interconnection Isolation Vlv AND ROUTE to drain THEN CYCLE 22-2430 open AND closed to ensure pipe vented. **Cue:** Connected as described.	Connects hose at 22-2430 AND routes to drain. 22-2430 cycled to vent pipe.	
5*	CONNECT hose to fitting downstream of 22-2429, Fire Protection/RHR Interconnection Isolation Valve. **Cue:** Connected as described.	Connects one end of hose to downstream side of 22-2429.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
6*	CONNECT other end of hose to 51-2178, 2A RHR Fire Protection Crosstie Connection Isolation Valve. **Cue:** Connected as described.	Connects other end of hose to 51-2178.	
7*	OPEN 22-2429 **Cue:** Valve handwheel turns in the counter-clockwise direction and stops.	Turns 22-2429 handwheel fully counterclockwise.	
8*	UNLOCK AND OPEN 51-2178 **Cue:** Handwheel turns in counterclockwise direction and stops.	Turns 51-2178 handwheel fully counterclockwise.	
9	START available Fire Pump:	Not Applicable	
10	IF starting 00P512, Motor Driven Fire Pump, THEN DEPRESS HS-22-002-1 at 00C650 (Main Control Room) AND VERIFY pump starts. **Cue:** If asked, reply that MDFP is not available.	Recognize from task conditions that the Motor Driven Fire Pump is unavailable and proceed to Step 4.2.2.	
11	IF starting 00P511, Diesel Driven Fire Pump, THEN DEPRESS HS-22-6-1 at 00C650 (Main Control Room) AND VERIFY pump is running. **Cue:** MCR attempts to start the Diesel Driven Fire Pump have been unsuccessful.	Contacts main control room and requests start of DDFP. When MCR reports failure to start, continues with procedure.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
12	PLACE control switch at 00C519 (Diesel Fire Pump Room) in MANUAL A. **Cue:** Switch is in Manual A.	Places control switch in Manual A.	
13	AND DEPRESS AND HOLD HS-22-026-2 in START at 00C519 until diesel starts. **Cue:** Switch is in START .position, the engine is not cranking.	HS-22-026-2 in START position. Recognizes failure to start and continues with procedure.	
14	PLACE control switch at 00C519 (Diesel Fire Pump Room) in MANUAL B. **Cue:** Switch is in Manual B.	Control switch in MANUAL B.	
15	AND DEPRESS AND HOLD HS-22-026-2 in START at 00C519 until diesel starts. **Cue:** Switch is in START position, the engine is not cranking.	HS-22-026-2 in START position. Recognizes failure to start and continues with procedure.	
16*	IF 00P512, Motor Driven Fire Pump, AND 00P511, Diesel Driven Fire Pump, are not available, THEN PLACE control switch for 10P402, Backup Diesel Driven Fire Pump, in TEST at 10C096 (Lower Parking Lot Pump Enclosure) AND VERIFY pump starts. **Cue:** Switch is in TEST, diesel cranks and comes up to speed.	Places control switch for 10P402 in TEST.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
17	WHEN a Fire Pump is running, THEN OPEN HV-51-2F017B, (Outboard) at 10C601 (Main Control Room). **Cue:** If asked, report that the HV-51-2F017B is now open.	MCR contacted and asked to open HV-51-2F017B for injection.	
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM I

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 2 reactor level is low and injection is being established
- Reactor pressure is 50 psig
- The Motor Driven Fire Pump is out of service and unavailable

Initiating Cue:

Shift Supervision directs you to perform T-244 to supply Fire Water to increase Unit 2 reactor level.

NRC JPM J

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Transfer RWST to CST Job Performance Measure: NRC JPM J

K/A Reference: 203000 A2.04 (3.5, 3.6)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:
A station blackout has occurred. Procedure E-1, Loss of All AC Power (Station Blackout), is being implemented.

Initiating Cue:
You are directed to initiate gravity feed from the RWST to #1 CST in accordance with E-1, Step 3.20. There is sufficient RWST inventory for this transfer.

Required Materials:
Pages from E-1, Loss of All AC Power (Station Blackout) containing Step 3.20.

General References:
E-1, Loss of All AC Power (Station Blackout), Rev. 033

JPM Origination: New

Task Standard:
Initiate gravity feed from the U1 RWST to the U1 CST.

Alternate Path: No Time Critical: No Validation Time: 15 min

JPM Setup Instructions:
None

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	ENSURE 08-0008 closed. **Cue:** Valve is closed.	Verifies 08-0008 is closed.	
2	ENSURE 08-0029 closed. **Cue:** Valve is closed.	Verifies 08-0029 is closed.	
3	ALIGN the following valves:	Not applicable	
4*	1. 08-0001, Tie Between RWST and Manifold – OPEN **Cue:** Valve is open.	Opens 08-0001.	
5*	2. 08-0003, Tie Between #1 CST and Manifold – OPEN **Cue:** Valve is open.	Opens 08-0003.	
6*	3. 08-0004, Manifold Stop Valve – OPEN **Cue:** Valve is open. You hear flow noise.	Opens 08-0004.	
7	Inform control room that gravity feed has been initiated from RWST to #1 CST.	Informs control room. **Cue:** JPM is complete.	

Verification of Completion

Job Performance Measure: NRC JPM J

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

_____

Response:_____

_____

_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

A station blackout has occurred. Procedure E-1, Loss of All AC Power (Station Blackout), is being implemented.

Initiating Cue:

You are directed to initiate gravity feed from the RWST to #1 CST in accordance with E-1, Step 3.20. There is sufficient RWST inventory for this transfer.

NRC JPM K

2008 Limerick Operating Exam

Facility: Limerick

Task Title: Supply Emer Power to RCIC Isolation Job Performance Measure: NRC JPM K

K/A Reference: 600000 AK3.04 (2.8, 3.4)

Examinee: _____ NRC Examiner: _____

Date: _____

Method of testing:

Simulated Performance: X Actual Performance:

Classroom Simulator Plant X

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- A fire in the Main Control Room has required evacuation and control of the plant from the RSP.
- Division 3 power is not available.
- RCIC is required but has failed to inject.
- HV-49-2F007, RCIC Main Steam Supply Inboard PCIV has NO position indication.
- Personnel are stationed at the RSP.

Initiating Cue:

You are directed to supply Div 1 power to HV-49-2F007, in preparation for placing Unit 2 RCIC in service from the RSP in accordance with SE-1, Section 4.3.8 Reactor Level Control. **This is a time-critical JPM.**

Required Materials:

SE-1, Remote Shutdown

General References:

SE-1, Remote Shutdown, Rev. 59

JPM Origination: Limerick Bank JPM 0250, Rev. 007

Task Standard:

Division 1 power supplied to HV-49-2F007, RCIC Main Steam Supply Inboard PCIV

Alternate Path: No Time Critical: Yes Validation Time: 5 min

JPM Setup Instructions:

Inform Unit 2 Main Control Room that Terminal Box 2OTB49-2F007 will be opened for training. Ensure locked valve entry is made.

Performance Information

Critical steps denoted with an asterisk

Step	Element	Standard	Comment / Sat/Unsat
1	Obtain current revision of SE-1, Remote Shutdown. **Cue:** Provide a copy of SE-1	Not applicable	**Note:** Time critical JPM. Must be completed within 14 minutes. **Start Time:**
2	**CAUTION** Steps 4.3.8.1 through 4.3.8.7 are Prompt Actions, requiring completion within 14 minutes. **NOTE** Step 4.3.8 indicates HV-49-*F007 has failed closed. **IF** the following conditions exist: Div 3 power has been disrupted RCIC fails to inject on manual **OR** auto start signal HV-49-*F007 has no position indication **THEN** PERFORM the following to supply Div 1 power to HV-49-2F007, **AND** PLACE RCIC in service:		
3*	(Step 4.3.8.1) OPEN D*34-R-E-13. (Unit 1: 402-R15-253, Unit 2: 475-R13-253).	Opens D234-R-E-13 (Unit 2: 475-R13-253) **Cue:** D234-R-E-13 is open.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
4*	**NOTE** A screwdriver **AND** LV-*00 key are required for step 4.3.8.2. (Step 4.3.8.2) UNLOCK **AND** OPEN terminal box *OTB49-*F007 (Unit 1: 402-R15-253, Unit 2: 475-R14-253).	Obtains a screwdriver and LV-200 key. Unlocks and opens Terminal Box 2OTB49-2F007 (Unit 2: 475-R14-253). **Cue:** Terminal box is unlocked and opened. **Cue:** If asked, inform applicant that both lamps are out in the cabinet.	**Note:** Normal power is de-energized (the reason for the task) and the alternate power supply breaker has not been closed yet). The lamps indicate the status of power just upstream of the molded case breakers in the cabinet.
5*	(Step 4.3.8.3) PLACE 43-CB22313, Manual Transfer Switch (located in terminal box *0TB491*F007), in EMERGENCY.	Places 43-CB22313, Manual Transfer Switch in EMERGENCY. **Cue:** Switch is in EMERGENCY.	
6*	(Step 4.3.8.4) UNLOCK AND CLOSE D*14-R-C-31, RCIC Main Steam Inbd PCIV (EMERGENCY POWER). (Unit 1: 506-R11-283 Unit 2: 580-R17-283)	Unlocks and closes D214-R-C-31, RCIC Main Steam Inboard PCIV (EMERGENCY POWER) (Unit 2: 580-R17-283) **Cue:** D214-R-C-31 is closed.	
7*	(Step 4.3.8.5) OPEN HV-49-*F007 (INBOARD) at *0C201	Calls operator at 20C201 and directs him to open HV-49-2F007. **Cue:** Operator reports HV-49-2F007 is open.	
8*	(Step 4.3.8.6) LOCK OPEN D*14-R-C-31.	Locks open D214-R-C-31. **Cue:** D214-R-C-31 is open.	

Performance Information

Step	Element	Standard	Comment / Sat/Unsat
9*	(Step 4.3.8.7) RETURN 43-CB22313, Manual Transfer Switch, to NORMAL.	Returns 43-CB22313, Manual Transfer Switch, to NORMAL. **Cue:** 43-CB22313, Manual Transfer Switch is in NORMAL.	
10*	(Step 4.3.8.8) PLACE RCIC in service per step 4.3.3	Informs operator at RSP that procedure directs placing RCIC in service per Step 4.3.3.	**Note:** Time critical JPM. Must be completed within 14 minutes. **Stop Time:** **Time Elapsed:**
	Cue: JPM is complete.		

Verification of Completion

Job Performance Measure: NRC JPM K

Examinee's Name: _____

Examiner's Name: _____

Date Performed: _____

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

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Response:_____

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Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____ _____

Initial Conditions:

- A fire in the Main Control Room has required evacuation and control of the plant from the RSP.
- Division 3 power is not available.
- RCIC is required but has failed to inject.
- HV-49-2F007, RCIC Main Steam Supply Inboard PCIV has NO position indication.
- Personnel are stationed at the RSP.

Initiating Cue:

You are directed to supply Div 1 power to HV-49-2F007, in preparation for placing Unit 2 RCIC in service from the RSP in accordance with SE-1, Section 4.3.8 Reactor Level Control. **This is a time-critical JPM.**